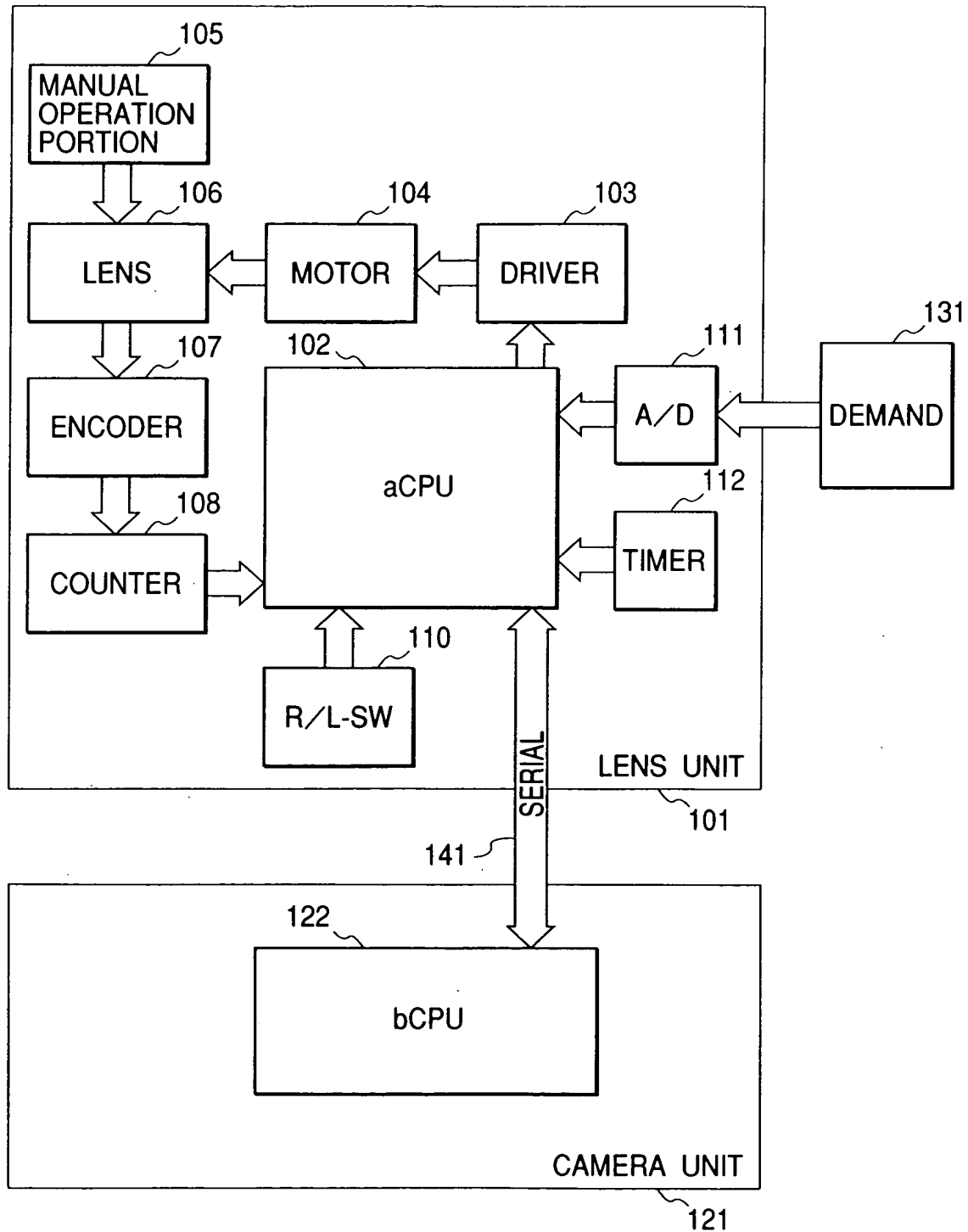


FIG. 1



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FIG. 2

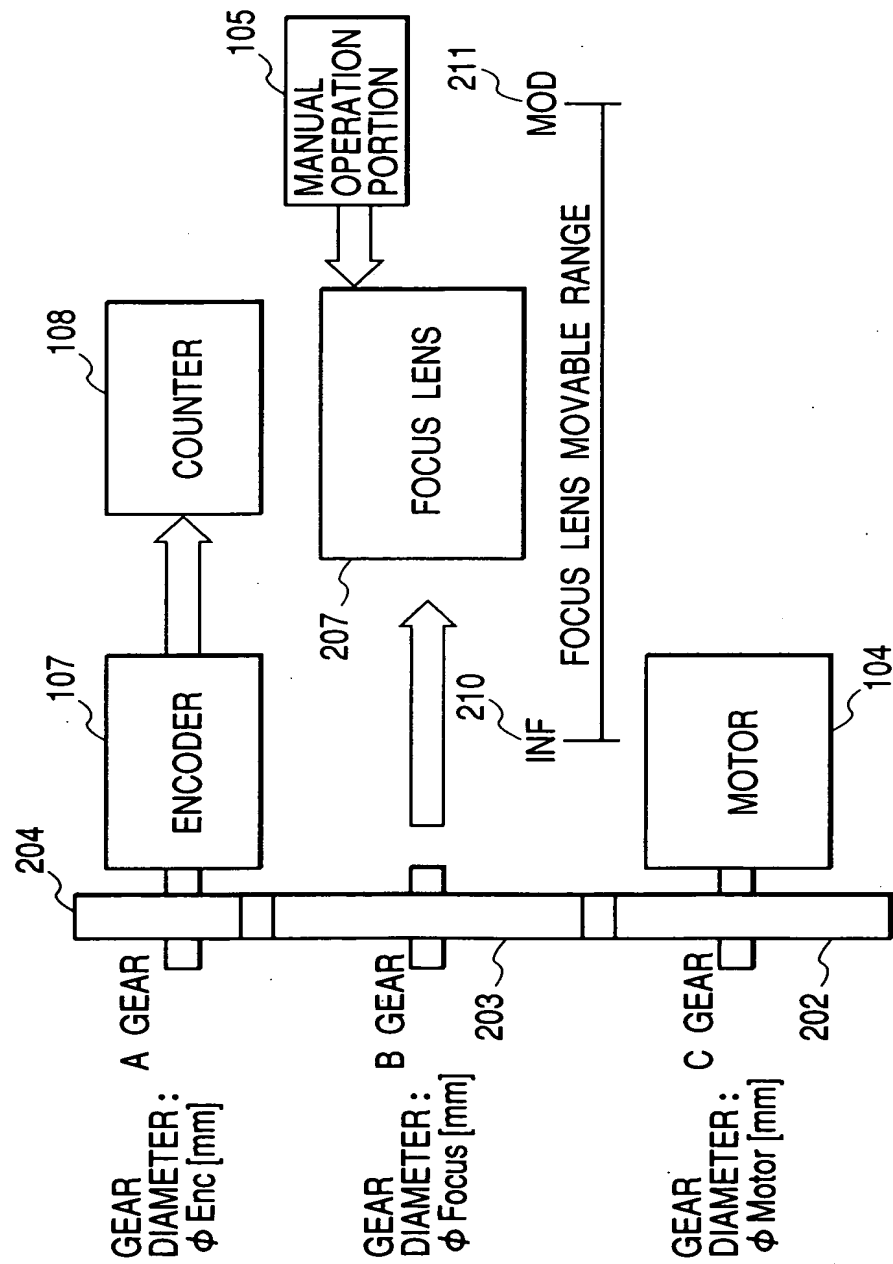


FIG. 3

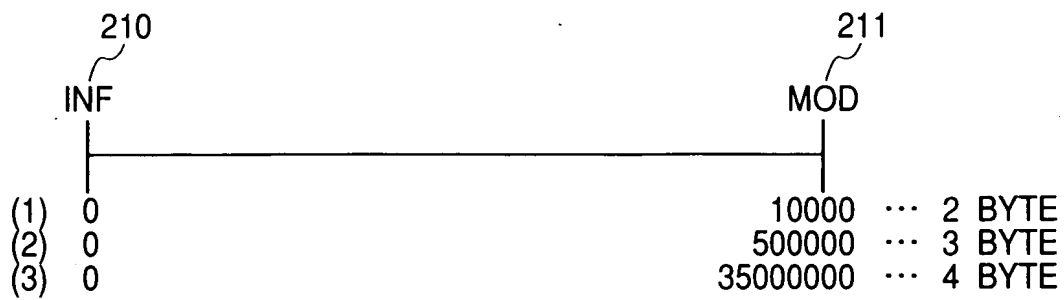


FIG. 4

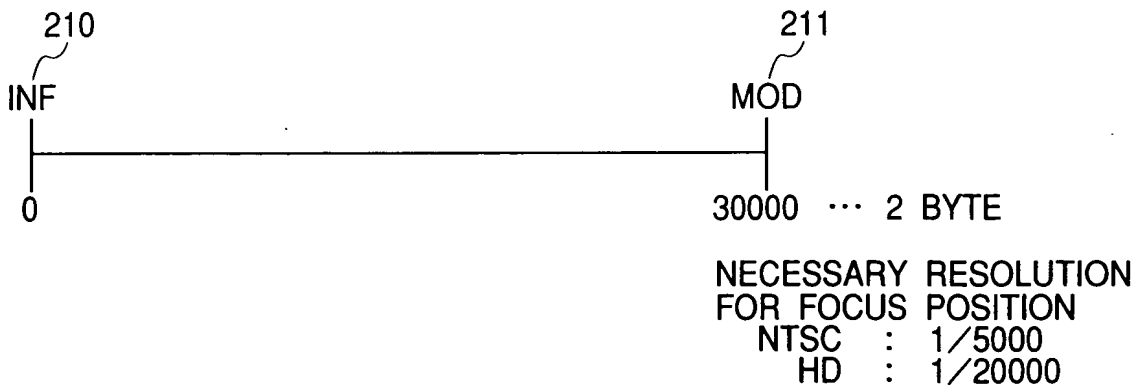


FIG. 5

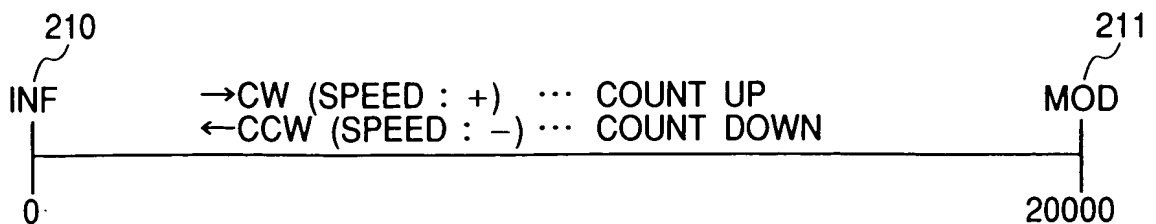


FIG. 6

OUTPUT PULSE NUMBER PER ONE ROTATION OF ENCODER		PPEnc [P/R]	
		2500	
MOTOR GEAR DIAMETER ϕ Motor [mm]	ENCODER GEAR DIAMETER ϕ Enc [mm]	COUNTER PULSE NUMBER PPTotal [pulse]	
		MOTOR ROTATION NUMBER FROM INF TO MOD	
		NRot=20	NRot=100
20	20	50000	250000
20	10	100000	500000
5	20	12500	62500

FIG. 7

OUTPUT PULSE NUMBER PER ONE ROTATION OF ENCODER		PPEnc [P/R]	
		2500	
MOTOR GEAR DIAMETER ϕ Motor [mm]	ENCODER GEAR DIAMETER ϕ Enc [mm]	COUNTER PULSE NUMBER PPTotal [pulse]	
		MOTOR ROTATION NUMBER FROM INF TO MOD	
		NRot=20	NRot=100
20	20	200000	1000000
20	10	400000	2000000
5	20	50000	250000

FIG. 8A

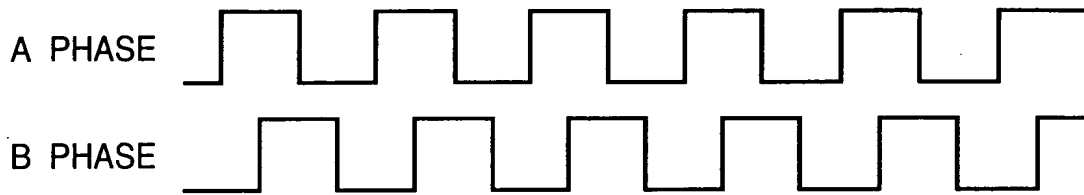
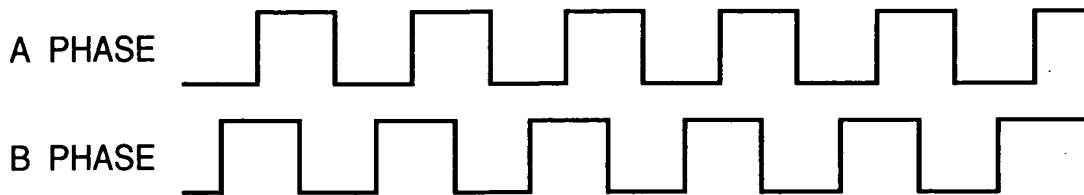


FIG. 8B



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FIG. 9

WHOLE RANGE NORMALIZED POSITION : 30000

SPEED COMMAND V SYNCHRONIZING UNIT	SPEED COMMAND CHANGING RATIO [%]	WHOLE RANGE MOVEMENT TIME [sec.]
1	100.00	500.00
2	50.00	250.00
3	33.33	166.67
4	25.00	125.00
5	20.00	100.00
6	16.67	83.33
7	14.29	71.43
8	12.50	62.50
9	11.11	55.56
10	10.00	50.00
⋮	⋮	⋮
25	4.00	20.00
26	3.85	19.23
27	3.70	18.52
28	3.57	17.86
29	3.45	17.24
30	3.33	16.67
31	3.23	16.13
32	3.13	15.63
33	3.03	15.15
34	2.94	14.71
⋮	⋮	⋮
1635	0.061	0.306
1636	0.061	0.306
1637	0.061	0.305
1638	0.061	0.305
1639	0.061	0.305
1640	0.061	0.305
1641	0.061	0.305
1642	0.061	0.305
1643	0.061	0.304
1644	0.061	0.304

SPEED COMMAND
CHANGING RATIO
IS CONSIDERABLY
LARGE

SPEED COMMAND
CHANGING RATIO
IS WITHIN 5%

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FIG. 10

FIG. 10		WHOLE RANGE MOVEMENT TIME [sec.]	
SPEED COMMAND V SYNCHRONIZING UNIT	SPEED COMMAND CHANGING RATIO [%]	WHOLE RANGE NORMALIZED PORTION 30000	WHOLE RANGE NORMALIZED PORTION 500000
1	100.00	500.00	8333.33
2	50.00	250.00	4166.67
3	33.33	166.67	2777.78
4	25.00	125.00	2083.33
5	20.00	100.00	1666.67
6	16.67	83.33	1388.89
7	14.29	71.43	1190.48
8	12.50	62.50	1041.67
9	11.11	55.56	925.93
10	10.00	50.00	833.33
⋮	⋮	⋮	⋮
25	4.00	20.00	333.33
26	3.85	19.23	320.51
27	3.70	18.52	308.64
28	3.57	17.86	297.62
29	3.45	17.24	287.36
30	3.33	16.67	277.78
31	3.23	16.13	268.82
32	3.13	15.63	260.42
33	3.03	15.15	252.53
34	2.94	14.71	245.10
⋮	⋮	⋮	⋮
1635	0.061	0.306	5.097
1636	0.061	0.306	5.094
1637	0.061	0.305	5.091
1638	0.061	0.305	5.088
1639	0.061	0.305	5.084
1640	0.061	0.305	5.081
1641	0.061	0.305	5.078
1642	0.061	0.305	5.075
1643	0.061	0.304	5.072
1644	0.061	0.304	5.069
⋮	⋮	⋮	⋮
27365	0.004	0.018	0.305
27366	0.004	0.018	0.305
27367	0.004	0.018	0.305
27368	0.004	0.018	0.304
27369	0.004	0.018	0.304
27370	0.004	0.018	0.304

FIG. 11

		WHOLE RANGE MOVEMENT TIME [sec.]	
SPEED COMMAND V SYNCHRONIZING UNIT	SPEED COMMAND CHANGING RATIO [%]	WHOLE RANGE NORMALIZED PORTION 1000	WHOLE RANGE NORMALIZED PORTION 500000
1	100.00	16.67	8333.33
2	50.00	8.33	4166.67
3	33.33	5.56	2777.78
4	25.00	4.17	2083.33
5	20.00	3.33	1666.67
6	16.67	2.78	1388.89
7	14.29	2.38	1190.48
8	12.50	2.08	1041.67
9	11.11	1.85	925.93
10	10.00	1.67	833.33
⋮	⋮	⋮	⋮
33	3.03	0.505	252.53
34	2.94	0.490	245.10
35	2.86	0.476	238.10
36	2.78	0.463	231.48
37	2.70	0.450	225.23
38	2.63	0.439	219.30
39	2.56	0.427	213.68
40	2.50	0.417	208.33
41	2.44	0.407	203.25
42	2.38	0.397	198.41
43	2.33	0.388	193.80
44	2.27	0.379	189.39
45	2.22	0.370	185.19
46	2.17	0.362	181.16
47	2.13	0.355	177.30
48	2.08	0.347	173.61
49	2.04	0.340	170.07
50	2.00	0.333	166.67
51	1.96	0.327	163.40
52	1.92	0.321	160.26
53	1.89	0.314	157.23
54	1.85	0.309	154.32
55	1.82	0.303	151.52
56	1.79	0.298	148.81
57	1.75	0.292	146.20
58	1.72	0.287	143.68
59	1.69	0.282	141.24
60	1.67	0.278	138.89

SPEED
COMMAND
CHANGING
RATIO IS
CONSIDERABLY
LARGE

IN CASE THAT
NORMALIZED
POSITION IS
"1000",
SINCE SPEED
COMMAND
CHANGING
RATIO IS
CLOSE TO
"2%", SPEED
COMMAND IS
EASY TO DEAL
WITH

FIG. 12

V SYNCHRONIZING UNIT = 1/60 (sec.)

	NORMALIZED SPEED COMMAND 50 [STEP/V SYNCHRONIZING UNIT]	
	WHOLE RANGE NORMALIZED POSITION FOR SPEED COMMAND	WHOLE RANGE MOVING TIME [sec.]
HIGH SPEED MOVEMENT SPEED COMMAND	1000	0.33
MIDDLE SPEED MOVEMENT SPEED COMMAND	30000	10.00
LOW SPEED MOVEMENT SPEED COMMAND	500000	166.67

FIG. 13

WHOLE RANGE NORMALIZED POSITION COMMAND	WHOLE RANGE NORMALIZED POSITION DATA
---	---

A1H

LOW SPEED MOVEMENT NORMALIZED SPEED COMMAND	NORMALIZED SPEED COMMAND DATA
---	-------------------------------

B1H

MIDDLE SPEED MOVEMENT NORMALIZED SPEED COMMAND	NORMALIZED SPEED COMMAND DATA
--	-------------------------------

B2H

HIGH SPEED MOVEMENT NORMALIZED SPEED COMMAND	NORMALIZED SPEED COMMAND DATA
--	-------------------------------

B3H

HEAD PORTION
8 BIT

DATA PORTION
16 BIT

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